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(54) **Method for sealing containers and for ensuring their correct allocation to a preset user, and device for performing the method**

Verfahren zum Schliessen von Behältern und zum Sicherstellung der richtigen Zuteilung zum vorbestimmten Benutzer und Vorrichtung zur seiner Ausführung

Procédé de fermeture de récipients et pour assurer l'attribution exacte à un utilisateur prédéterminé et appareil d'exécution

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Description

[0001] The present invention relates to a method for sealing containers, in particular blood bags, test-tubes containing samples for laboratory tests and the like, and for ensuring their correct allocation to a preset user, such as a specific patient, or a specific laboratory, and to a device for performing this method.

[0002] In hospitals it is often necessary to allocate to a specific patient a type of blood or a specific blood product that has been prepared specifically for that patient.

[0003] Obviously, a mistake in allocation can cause severe harm and even the patient's death.

[0004] Human error is the most frequent cause of acute fatal hemolytic reactions in blood transfusion and may occur in procedures concerning either the taking of blood samples or the distribution and/or transfusion of blood units.

[0005] The aim of the present invention is to provide a method that can ensure a very high degree of safety, so as to in practice eliminate the occurrence of mistakes in recognizing or allocating a container intended for a pre-set user.

[0006] Within the scope of this aim, a specific object of the present invention is to provide a method that allows to seal the container with the possibility of memorizing and identifying or recognizing the recipient user, so as to prevent opening unless a special identification or recognition procedure that authorizes the recipient to have access to the contents has given a positive result.

[0007] Another object of the present invention is to provide a sealing device suitable for releasing, upon request, a number of information data such as the kind of test to be carried out on the contents of a container sealed by the device, laboratory test standards followed or to comply with, type of taken sample, kind of request to be satisfied or answer to be given, date, time and name of the sending forwarding operator, details on the recipient, and the like information.

[0008] Another object of the present invention is to provide a sealing device that is highly reliable, since it allows to standardize recognition procedures, frees them from subjective decisions, is relatively easy to manufacture at competitive costs, and is simple and practical to use.

[0009] According to a first aspect of the present invention, a method is provided for sealing containers and ensuring their correct allocation to a preset recipient user according to claim 1.

[0010] According to another aspect of the present invention, a device for sealing containers and ensuring their correct allocation to a preset recipient user according to claim 7 is provided.

[0011] Further aspects and advantages of the present invention will become apparent from the following description of a currently preferred but not exclusive embodiment thereof, illustrated only by way of non-limit-

ing example in the accompanying drawings, wherein:

figure 1 is a schematic view of a module for the electronic control of a box or container for blood transport;

figure 2 is a view of an input data module, in the form of an alphanumeric keyboard, and of a badge reader, to be connected to the module of figure 1;

figure 3 is a view of an identification or recognition device for patient test-tubes containing laboratory test samples for a patient;

figure 4 is a view of an electronic key and of a key-generating module;

figure 5 is a view of a box-like seal for transporting a container, such as a blood bag;

figure 6 is a view of an electronic locking module of a seal, such as that of figure 5;

figure 7 is a flowchart of the control software of the control module of figure 1;

figure 8 is a flowchart of the control software of the recognition device of figure 3;

figure 9 is a flowchart of the control software of the locking module of figure 6;

figure 10 shows a flowchart illustrating the general method according to the present invention; and

figure 11 is a flowchart of a control software for a safety reception procedure.

[0012] A specific embodiment of a sealing device according to the present invention is described below with specific reference to bag-like containers, particularly for transporting blood and blood products.

[0013] It will be noted that the device according to the invention comprises several components that can be connected to one another and are described in greater detail hereinafter.

[0014] With reference to figures 1 to 6, a control module or apparatus 1 is schematically shown which comprises an electronic circuit 11, rechargeable batteries 12 arranged to power the circuit 11, a printer 13, and an LED 15 for indicating the ON state and the charge status of the battery 12. The control apparatus 1 also has a number of connectors, i.e., a connector 19 for connection to a battery charger (not shown), a connector 16 for connection to an electronic key 50 (figure 4), a connector 17 for connection to a box-like seal or transportation container 6 (figure 5), a connector 18 for connection to a data input module 30 and/or 35 (figure 2), and a connector 14 for connection to a key-generating module 55 (figure 4).

[0015] The control apparatus 1 is meant to check the match between the code of the recipient user, e.g. a patient, stored in an electronic key 50, and the allocation code stored in the box-like seal or transportation container 6. In case of a match, the apparatus 1 enables unlocking of the box-like seal or container 6. The control module 1 is controlled by suitable software, a flowchart of the same is shown in figure 7 and its functions will be

explained hereinafter.

[0016] Figure 2 shows a data input module 30 that comprises an alphanumeric keyboard 33, a connector 31 for connection to the control module 1, and a badge reader 35 provided with a connector 36 for direct connection to the control module 1 (if the keyboard in the module 30 is missing) or for connection to a connector 32 of the module 30, in order to have both data input means available. The modules 30 and 35 are arranged to transfer the operator's personal code or other information data, which can be numeric or alphanumeric, to the control means 1.

[0017] The badge reader 35 can be of the magnetic type or of the type suitable for reading chip-cards.

[0018] Figure 3 illustrates a module 4 for identifying samples (for example test-tubes) for carrying out tests on the patient, which comprises an electronic circuit 40, a printer 44, e.g. a single-sheet printer, a connector 41 for connection to the control module 1, a connector 42 for connection to an external optical reader (not shown), a connector 43 for connection to an external module (not shown) for locking the samples (test-tubes) to be tested in a laboratory, an internal optical reader 45, mechanical retaining means 47, for example of the clamping type for the test-tubes, and a reader 46 (located inside the module) for detecting the presence or absence of material in the test-tube held by the retaining means.

[0019] Power to the test sample identification module 4 for samples to be tested is supplied by the control module 1, to which the module 4 must be connected by means of the connector 41. The module 4 has the function of controlling the drawing of sample material (e.g. blood) from a patient, to whom an electronic personal identification key 50 has already been allotted. Once comparison between the code of the key 50 and the label on the container (test-tube) is positive, the module 4 locks the container in position by means of the clamping means 47.

[0020] After the test-tube has been filled with blood as a consequence of direct drawing from the patient, the module 4 prints a report that filling has occurred on a companion sheet and unlock the test-tube to allow its removal for being sent to a laboratory.

[0021] The operator, by using the keyboard 33, can select the type of information to be coded (e.g. on a bar code) on the container or test-tube, e.g. the kind of test to be carried out and test data requested, type of drawn sample, identification code of the operator and the like. Automatic application of date, hour, etc. can be provided, if desired.

[0022] Further information data, such as personal identification data of the patient and codes of the operations and/or functions selected by the operator can also be printed either in coded form or in alphanumeric cards on a sheet that will accompany the transportation container.

[0023] The sample identification module 4 is control-

led by a specific control software, the flowchart of which is shown in figure 8 and the functions of which will be described hereinafter.

[0024] As shown in figure 4, an electronic key 50 comprises: a connector 51 for connection to the key-generating module 55 or to the control module 1; a memory chip 52 that stores the patient's coded data, and a slit 53 for a strap (not shown) for securing the key, for example to the patient's wrist. The electronic key 50 stores a personal code of the patient, which includes for example the nosological code and the date of birth of the patient or can contain previously stored numerals for identifying a specific set (key plus sample container) to be tested.

[0025] The electronic key 50 has the function of activating the unlocking of the box-like transportation seal 7 by means of the control module 1, according to the method described hereinafter.

[0026] The key-generating module 55 is provided with a connector 59 for connection to the key 50, with an electronic circuit 57 fed by batteries 58 or by external mains through a suitable feeder, and with a connector 56 for connection to a personal computer or to the control module 1. The key-generating module 55, when connected to an electronic key 50, stores therein the personal code of the patient, under the control of a software available in the PC or through the control module 1.

[0027] The box-like seal 6 (figure 5) is provided with a memory circuit and with connectors, i.e., a connector 61 for connecting it to the control module 1 and an additional service connector 62 for performing circuit tests with the aid of an external unit (not shown).

[0028] A solenoid 63 is arranged inside the box-like seal 6 and is arranged to mechanically lock and unlock the box 6 to allow removal of the blood or blood product from the bag that has been sealed by said seal.

[0029] The seal 6 can be released in emergency by means of screws 64. The screws 64 are arranged under a removable label (for example a metallic label) that makes it possible to detect any tampering of the box-like seal 6. The seal 6 is locked in closed position after a bag of blood or blood product, allocated to a preset patient, has been sealed inside it. Authorization to open the box-like seal 6 is given by means of the control module 1, after performing an allocation checking procedure has been performed as explained in more detail hereinafter.

[0030] The seal 6 is locked in closed position by means of the locking module 7 (figure 6), which comprises a memory circuit 71 that is powered by batteries 72 that can be recharged by means of an external battery charger (not shown) or by means of an external power supply (not shown). The connection to the battery charger or to the power supply occurs by means of an appropriate connector 74. A LED 73 is provided on the locking module 7 to indicate whether the device is ON and to indicate the charging status of the battery 72. There are also two connectors 75 and 76, one of which is used for connection to an external processing unit,

not shown, such as a PC.

[0031] The seal 6 constitutes a passive electric means provided with memory circuits and with circuits for controlling the solenoid 63, in which the data for allocation to a specific patient remain stored.

[0032] The seal 6 can be controlled by the locking module 7 by means of a PC that is provided with a suitable control software, the flowchart of which is shown in figure 9 and the functions of which will be described hereinafter.

[0033] The operation of the above described sealing device is as follows:

in a ward, a preset patient code, for example a patient's nosological code including date of birth, etc., is generated by means of the key-generating module 55 and is stored in an electronic key 50 that can be physically allocated to the patient, for example by applying it to his wrist by means of a strap of self-sealing type.

[0034] If required, the device then prints patient's identification labels, unit requests with the identification data of the patient, any specific activity to be performed on the sample, etc..

[0035] A blood or blood product supply center, after receiving a request for allocation of a bag of blood for a given patient, identifies a bag of blood or blood product that has the requested properties.

[0036] Sealing of the bag is then performed with the electronic box-like seal 6, while said seal is connected to the locking module 7 through the respective connectors 61 and 75. The module 7 can be connected to an external processing unit (not shown) via its connector 76. The locking module 7, by energizing the solenoid 63, causes locking of the seal 6 and stores the unlocking code (that is to say, the bag code, the recipient code, and the control code) in the seal 6 which is now secured to or around the bag. The bag thus sealed is forwarded to the patient, for example delivered to the ward in which the patient is hospitalized.

[0037] The control of this function is performed in the software of the external processing unit, e.g. a PC, and by the software inside the locking module 7, which will be described in greater detail hereinafter with reference to figure 9.

[0038] The product code is first entered in the external processing unit (step 120) which reads out any stored data (step 120A) and stores the read out data either into a file (stage 120B) and/or into the memory of a module 1 (stage 120C). The processing unit effects then the necessary comparisons (step 120D) and after that the code of the recipient user (step 121) is entered. If provided for, the operator code is entered (step 122) by means of the entry module 30 and/or 35. Subsequently the control code for mutually checking the product code and the recipient user (patient) code, generated in the module 7 and meant to be transferred into the seal 6

(step 123), is generated. The previous code and the data stored in the memory of the seal 6 are read (step 124) and stored in an appropriate external history file (for example on a PC) (step 125). If required, information for a recipient laboratory or other identification data concerning the forwarding center or control data can be stored (step 126A). In step 126 the box-like seal 6 is locked by energizing the closure solenoid 63 (figure 5). The codes previously generated by the locking module 7 are then recorded in the seal 6 (step 127) and re-read in step 128. If the comparison (step 129) is positive, the codes are stored in an external input history file (step 130) and the process ends by restoring the routine (step 131). If the comparison is negative, the locking module 7 unlocks the seal 6 and requests the entire procedure to be repeated (step 132).

[0039] In the ward, the comparison between the code of the electronic key 50 and the codes contained in the electronic box-like transportation seal 6 is performed by means of the control module 1.

[0040] If the comparison is positive, the control module 1 authorizes the opening of the box-like seal 6, thus allowing to use the contents of the bag.

[0041] Otherwise, unlocking does not occur and the seal cannot be opened. It is also possible to provide for an emergency opening of the bag. In any case, appropriate messages are printed by means of the printing machine or printer 13, as described hereinafter with reference to figure 7.

[0042] More particularly, the control module 1 is switched on (step 100) and the circuit between the electronic key 50 and the box-like seal 6 is closed by means of the respective connectors 16 and 17 (figure 1).

[0043] If provided for, the operator code is entered (step 101) by means of the entry module 30 and/or 35; if said code is recognized, the user code is read in the electronic key 50 (step 102), then both the product code and the user code are read in the electronic seal 6, where the control code "X" is also read (step 103). A control code "Y" is generated in the subsequent step 104 from the product code read in the seal 6 and from the code read in the electronic key of the patient; then a comparison between these control codes "X" and "Y" is performed in the subsequent step 105. Directly after this (step 106), the date and time are read in the suitably provided clock in the control module 1. The step 107 shows the three possibilities that arise from the comparison in step 104.

[0044] If the control codes "X" and "Y" are identical, the allocation is correct, and therefore a message containing a report of normal opening, the date, the time, the product code, the user code in the seal 6, and the code of the electronic key of the patient is printed in step 108, and a signal authorizing the opening of the box-like seal 6 is generated in the subsequent step 109, whereas during the subsequent step 110 said codes and the operator code are stored in the memory of the seal 6 or in the key 50, and the operation ends (step

111).

[0045] If the control codes "X" and "Y" differ, this means that the allocation is incorrect, and therefore a message that contains the indication of an error in recipient user code and date, time, product code, sending user code in the seal 6, and the code of the electronic key of the patient is printed in step 112. The history data of the event are stored in the seal 6 or in the key 50 in step 113, and the operation ends (step 114).

[0046] If the control codes "X" and "Y" are different but the code of the key has a preset emergency value, the emergency opening status is recognized. A message that contains the emergency opening indication, date, time, product code, user code in the seal, code of the electronic key, and code and identification data of the key owned by the person in charge, is printed in step 115. The box-like seal 6 is then opened in step 116 and the said codes and the operator code are stored in said module in step 117.

[0047] The operation ends in the subsequent step 118, where the control module 1 is switched off, as in steps 111 and 114.

[0048] At a center where empty and incorrectly allocated containers or bags are gathered, the container code is read and the device is unlocked (step 111A) and if printing out of such code is required, this is done at 111B. Then, all information data are memorized (step 111C) and/or stored in a file in an external PC at step 111D and checked.

[0049] A way in which the control module 1 and the module 4 can be used for identifying samples of material to be subjected to chemical analysis is described hereinafter. For convenience, reference is made to the requirements of a hospital ward with respect to a laboratory or transfusion center.

[0050] Blood samples, drawn in the ward from a specific patient, are to be delivered to a transfusion center for analysis. Also in this case it is necessary to guarantee accurate identification of the blood sample that belongs to a given patient. As explained above, it is necessary to prepare beforehand a key 50 for identifying the patient and a test-tube labelled with the same code.

[0051] Should the comparison between the code of the key 50 owned by the patient and the label on the container be positive, the empty container is fixed by means of the retaining means 47 and the comparison result is printed on the label of the container. Only after the container has been filled as a consequence of a blood drawing from the patient, the container is released for being forwarded to the transfusion center.

[0052] This process is controlled by the software (see flowchart of figure 8) of the module 4 for identifying samples of blood or of other material to be analyzed, whose functions are as follows.

[0053] The identification module 4 is switched on (steps 139 and 140) by means of the connection of the electronic key 50 and of the container of the material to the control module 1. If provided for, the entry module

30 and/or 35 is used to enter the code of the operator (step 141); only if said code is identified, the code of the electronic key 50 is read (step 142).

[0054] A check operation for spotting errors and in particular for making sure that the test tube is the correct one is effected at step 142A. Should the test tube be a wrong one, a further check operation is performed at step 142B to determine whether identification code of the ward or laboratory is stored in the key 50. If yes, then such a code is digitized in the key 50 (step 142) and memorized; if not, or after storing of the code, information data available in the key are displayed and/or printed at step 142D.

[0055] At stage 143 a number of assessments are automatically performed, i.e. without intervention of the operator, on the blood sample, e.g. the kind of test required, identification of the laboratory responsible for carrying out the test, details on the laboratory tests, modalities of blood taking, amount of blood required for the test, conditions for transporting the sample, type of answer, etc.. A check for errors is made at stage 143A, whereas at step 143, the internal optical reader is used to read the code of the container of the material (for example test-tube), and other desirable information data and in step 144 a comparison is made between the code of the electronic key 50 and the code of the pre-labeled test-tube.

[0056] If the comparison fails, a message containing an error indication, the date, the time, the code of the user key, the code of the container, and the code of the operator (step 145) is printed on the label of the test-tube, and the process ends.

[0057] If the comparison is positive, the container is blocked by the retaining means 47 (step 146) of the module 4 for identifying the samples of material. The reader 46 then checks for the presence of material in the container (step 147), and if there is liquid or other material in it the date and time are read in step 148.

[0058] At step 149 printing is performed on the label of the container, e.g. indicating the date, the time, the code of the container, the code of the recipient user, and optionally the code of the operator and the required tests on sample. Checking is performed to spot errors at stage 149A, for punching document at stage 149B, for updating information data on the key 50 at stage 149C, whereas data storing in the key is effected at step 149D.

[0059] At step 150, the container is then released, and the date, the time, the code of the electronic key, and the code of the container are printed on the companion request form. After storing in an appropriate file in the control module 1 (step 151), the process ends.

[0060] The above described method makes it possible to ensure correct identification of samples of material to be tested that originate from a well identified patient, with the possibility of reporting on any identification errors by printing appropriate messages, on the whole file history of both the container, its contents and the sample in the test tube.

[0061] The labels used to identify the various containers can have bar codes that can be read with optical readers preset for bar codes.

[0062] Figure 10 diagrammatically illustrates the main sequence of events according to the method of the present invention. 5

[0063] First of all, the sending user or operator and a recipient user or laboratory are identified by a specific code, that is also stored in an electronic key (step 200). Then, identification data of a container and the material 10 (e.g. blood) to be filled in the container and transferred and any treatment operation to be sequentially performed on the material are memorized on an electronic seal for the container at step 201.

[0064] At step 202 the container is filled or loaded, 15 sealed by means of an electronic seal and delivered to a recipient user or laboratory. A recognition procedure designed to check the information data concerning the operator responsible for the transportation, date, hour, place of delivery, etc., is carried out at step 203 by making 20 use of the memorized electronic key, whereas unlocking of the container and access to the material contained in it is performed on step 201.

[0065] Should the container be delivered to a laboratory or service center, an automatic safety reception 25 procedure can be performed as illustrated in figure 11.

[0066] The code of the transportation operator is checked at step 205. The (bar) code on a test tube 47 30 accompanying the container is read out at step 206 and information as to place, date, hour, receiving operator code, etc., are added to the label at step 207. The whole bulk of such added information data is stored in a memory at step 208 and at step 209 the same information data are printed out on a sheet and placed on a file 35 (step 210).

[0067] At step 211, the container, if empty, is stored in a storeroom for subsequent utilization, or forwarded to a processing unit, e.g. testing unit, or filling unit.

[0068] The device according to the invention is susceptible of numerous modifications and variations within the scope of the claims. 40

[0069] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly 45 such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims 50

1. A method for sealing containers and ensuring their correct allocation to a preset recipient user, comprising the steps of:

- allocating an identification or recognition code to a sending user; 55
- generating an electronic key that is unique for a

recipient user, said electronic key containing personal data of the recipient user;

- filling at least one container with at least one product to be transferred from the sending user to the recipient user;
- sealing said at least one container by means of an electronic seal (6);
- transferring the container to the recipient user;
- performing an identification or recognition procedure by means of the electronic key of the recipient user, and, in case of positive outcome of said procedure:
- authorizing access to the product in the container; characterized in that it comprises also the steps of:
- recording information data on the identification and access procedures followed, said information data comprising data relating to unauthorized attempted accesses and failed tried accesses, and data relating to the various passages from one user to another until the reaching of the recipient user; and
- said electronic seal (6) including an electronic locking device (7), said electronic locking device storing identification data of the contained product to be transferred to the recipient user, and control codes, said control codes constituting an unlocking code for the container;
- said electronic locking device (7) being connectable to said container and being connectable to an external control device (1) by means of connectors (75, 76).

2. A method as claimed in claim 1, characterized in that said filling step comprises identification by means of the control device of the electronic key and of the container, both of which are pre-coded; 35

- comparison of the data of the container with those of the electronic key;
- printing of the data concerning the outcome of the comparison and consequent validation or invalidation of the container;
- securing of the container so as to fix it to the control device before filling;
- filling of the container; and
- printing of data related to the outcome of the operation. 40

3. A method according to claim 2, characterized in that said filling operation comprises: 45

- reading the container content code by means of an external processing unit;
- entering the code of the recipient user;
- activating a sealing procedure by means of locking means that are provided with memory 50

- unit allowing bidirectional transfer of codes and data creation of control codes, and
- sealing of the container by means of the electronic sealing means.
4. A method according to claim 1, characterized in that said identification procedure comprises:
- reading the unlocking code of the container by means of a control device;
 - comparing the read unlocking code of the container with the data of the electronic key of the recipient user;
 - printing the data obtained from the outcome of the comparison and consequent authorization to or prevention from opening the electronic seal; and
 - storage of the operation outcome data.
5. A method according to claim 4, characterized in that it further comprises entering operator code in the control device.
6. A method according to claim 1, characterized in that in case of identification failure following the identification procedure, a procedure for emergency unlocking of the electronic seal is followed.
7. A device for sealing containers and ensuring their correct allocation to a preset recipient user, comprising:
- at least one electronic box-like seal (6) for containers of at least one product to be allocated to a recipient user, said electronic seal including electronic locking means (7);
 - means for generating at least one electronic programmable key containing an unlocking code;
 - control means (1) adapted to perform a comparison between said unlocking code stored in said electronic locking means and data contained in the at least one electronic key;
 - code entry and access means (30) for accessing and entering codes in the control means; characterized in that said at least one electronic programmable key is programmable with information data including identification data of the recipient user;
- said control means (1) provided with report means (13) for creating a final report of the performed comparison;
- said seal (6) comprises mechanical coupling means and electronic locking means (7) having an electronic memory unit (71) for said mechanical means, said memory unit being adapted to store said unlocking code for the opening of said container, said memory unit

also storing data related to unauthorized tempted accesses and failed tried accesses to the container, to keep track of the history of the container;

connector means being also provided to connect said electronic box-like seal to a container to be allocated to a recipient user.

8. A device according to claim 7, characterized in that said code entry and access means comprise an alphanumeric keyboard.
9. A device according to claim 7, characterized in that said code entry and access means comprise a badge reader.
10. A device according to claim 7, characterized in that said electronic seal comprises an actuation solenoid.
11. A device according to claim 10, characterized in that said electronic seal comprises a box-like body that can be opened and closed for receiving said mechanical coupling means and electronic locking means.
12. A device according to claim 11, further comprising a processing unit connectable to said electronic locking means.
13. A device according to claim 7, characterized in that said control means comprise at least one printer.
14. A device according to claim 7, characterized in that it comprises means for the identification of a container for the product to be allocated, said means including at least one reader for reading data on the container, means for comparing the data read on the container and the data stored in an electronic key, and a printer for printing the data of the comparison.

Patentansprüche

1. Verfahren zum Verschließen von Behältern und Gewährleisten Ihrer richtigen Zuweisung zu einem vorgegebenen empfangenden Benutzer, umfassend die Schritte:

Zuweisen eines Identifikations- oder Wiedererkennungscodes für einen versendenden Benutzer;
Erzeugen eines elektronischen Schlüssels, welcher einzigartig ist für einen empfangenden Benutzer, wobei der elektronische Schlüssel die persönlichen Daten des empfangenden Benutzers enthält;
Füllen mindestens eines Behälters mit minde-

stens einem Produkt, welches von dem versendenden Benutzer Zu dem empfangenden Benutzer verschickt werden soll;

Verschließen des mindestens einen Behälters mittels eines elektronischen Verschlusses (6);
Überführen des Behälters zu dem empfangenden Benutzer;
Durchführen eines Identifikations- oder Wiedererkennungsverfahrens mittels des elektronischen Schlüssels des empfangenden Benutzers, und, im Fall eines positiven Ausgangs dieses Verfahrens;
Autorisierung des Zugangs zu dem Produkt in dem Behälter;

dadurch gekennzeichnet, daß es weiterhin die Schritte umfaßt:

Aufzeichnung von Informationsdaten für die Identifikation und das folgende Zugangsverfahren, wobei die Informationsdaten Daten umfassen, welche sich auf nicht autorisierte Zugangsversuche und fehlgeschlagene Zugangsversuche beziehen und Daten, die sich auf die verschiedenen Wege von einem Benutzer zu einem anderen beziehen, bis zum Erreichen des empfangenden Benutzers;
und der elektronische Verschluß (6) eine elektronische Verschlußvorrichtung (7) beinhaltet, wobei besagte elektronische Verschlußvorrichtung die Identifikationsdaten des enthaltenen Produkts, welches zu dem empfangenden Benutzers transportiert werden soll und Kontrollcodes speichert, wobei die Kontrollcodes einen Entriegelungscode für den Behälter darstellen;

wobei die elektronische Verschlußvorrichtung (7) mit dem Behälter verbindbar ist und an eine externe Kontrollvorrichtung (1) über Verbinder (75,76) verbindbar ist.

2. Verfahren gemäß Anspruch 1, **dadurch gekennzeichnet**, daß der Füllschritt eine Identifikation mittels der Kontrollvorrichtung des elektronischen Schlüssels und des Containers umfaßt welche beide vorcodiert sind;

Vergleichen der Daten des Containers mit denen des elektronischen Schlüssels;
Drucken der Daten welche den Ausgang des Vergleichs und entsprechende Gültigkeit oder Ungültigkeit des Containers betreffen,
Sichern des Containers, um ihn mit der Kontrollvorrichtung zu verbinden, bevor der Container gefüllt wird.

Füllen des Containers und
Drucken der Daten, die sich auf den Ausgang des Verfahrens beziehen.

3. Verfahren gemäß Anspruch 2 **dadurch gekennzeichnet**,

zeichnet, daß besagtes Füllverfahren umfaßt:

Laser des Behälterinhaltscodes mittels einer externen Verarbeitungseinheit;
Eingabe des Codes des empfangenden Benutzers;
Aktivieren eines Verschlußverfahrens mittels Verschlußvorrichtungen, welche mit einer Gedächtniseinheit versehen sind, welche einen bidirektionalen Transfer von Codes und die Erzeugung von Kontrollcodes in Datenform erlaubt, und
Verschließen des Containers mittels der elektronischen Verschlußvorrichtungen.

4. Verfahren gemäß Anspruch 1 **dadurch gekennzeichnet**, daß das Identifikationsverfahren umfaßt:

Lesen des Entriegelungs_codes auf dem Container mittels einer Kontrollvorrichtung;
Vergleichen des gelesenen Entriegelungs_codes des Containers mit den Daten des elektronischen Schlüssels des empfangenden Benutzers;
Drucken der Daten, die als Ergebnis des Vergleichs erhalten wurden und entsprechende Autorisierung oder Verhinderung des Öffnens des elektronischen Verschlusses; und
Speichern der erhaltenen Verfahrensdaten.

5. Verfahren gemäß Anspruch 4, **dadurch gekennzeichnet**, daß es weiterhin das Eingeben des Operatorcodes in die Kontrollvorrichtung umfaßt.

6. Verfahren gemäß Anspruch 1, **dadurch gekennzeichnet**, daß im Falle eines Fehlschlagens der Identifikation nach dem Identifikationsprozeß eine Notentriegelung des elektronischen Verschlusses folgt.

7. Vorrichtung zum Verschließen von Behältern und Sichern ihrer korrekten Zuordnung zu einem vorgegebenen empfangenden Benutzer, umfassend; mindestens einen elektronischen kastenförmigen Verschluß (6) für Behälter für mindestens ein Produkt, welches einem empfangenden Benutzer zugeordnet werden soll, wobei der elektronische Verschluß elektronische Verschlußmittel enthält (7);

Mittel zum Erzeugen mindestens eines elektronisch programmierbaren Schlüssels, welcher einen Entriegelungscode enthält;
Kontrollmittel (1), geeignet zum Durchführen eines Vergleichs zwischen dem Entriegelungscode, welcher in dem elektronischen Verschlußmittel gespeichert ist, und den Daten, welche in dem mindestens einen elektronischen Schlüssel enthalten sind;

- Codeeingabe- und -zugangsmittel (30) zum Zuführen und Eingeben der Codes in die Kontrollvorrichtungen;
- dadurch gekennzeichnet**, daß mindestens ein elektronischer programmierbarer Schlüssel mit Informationsdaten programmiert werden kann, welche die Identifikationsdaten des empfangenden Benutzers umfassen;
- wobei die Kontrollmittel (1) mit Berichtsmitteln versehen sind (13) zum Erzeugen eines Abschlußberichts über die durchgeführten Vergleiche;
- besagter Verschuß (6) mechanische Kopplungsmittel und elektronische Verschußmittel (7), welche eine elektronische Gedächtniseinheit (71) für die mechanischen Mittel besitzen, umfaßt, wobei die Gedächtniseinheit geeignet ist, die Entriegelungscodes für das Öffnen des Behälters zu speichern, wobei die Gedächtniseinheit ebenfalls die Daten, die sich auf nicht autorisierte Zugangsversuche und fehlgeschlagene Zugangsversuche zu dem Behälter beziehen, speichert, um die Geschichte des Behälters zu verfolgen;
- zusätzlich Verbindungsmittel vorgesehen sind, um den besagten elektronischen kastenförmigen Verschuß mit einem Behälter zu verbinden, welcher einem empfangenden Benutzer zugeordnet ist.
8. Vorrichtung nach Anspruch 7, **dadurch gekennzeichnet**, daß die Codeeingabe- und -zugangsmittel eine alphanumerische Tastatur umfassen.
9. Vorrichtung gemäß Anspruch 7, **dadurch gekennzeichnet**, daß die Codeeingabe- und -zugangsmittel einen Plakettenleser umfassen.
10. Vorrichtung gemäß Anspruch 7, **dadurch gekennzeichnet**, daß der elektronische Verschuß einen auslösenden Solenoid enthält.
11. Vorrichtung gemäß Anspruch 10, **dadurch gekennzeichnet**, daß der elektronische Verschuß einen kastenförmigen Körper umfaßt, welcher geöffnet und geschlossen werden kann, um die mechanischen Kopplungsmittel und elektronischen Verschußmittel aufzunehmen.
12. Vorrichtung gemäß Anspruch 11, welche weiterhin eine Verarbeitungseinheit umfaßt, welche mit den elektronischen Verschußmitteln verbindbar ist.
13. Vorrichtung gemäß Anspruch 7, **dadurch gekennzeichnet**, daß die Kontrollmittel mindestens einen Drucker umfassen.
14. Vorrichtung gemäß Anspruch 7, **dadurch gekenn-**

zeichnet, daß sie Mittel für die Identifikation eines Behälters für das Produkt, welches zugeordnet werden soll, umfassen, wobei diese Mittel mindestens einen Leser zum Lesen von Daten auf dem Container, Mittel zum Vergleichen der gelesenen Daten auf dem Container mit den Daten, die in einem elektronischen Schlüssel gespeichert sind und einen Drucker zum Drucken der Vergleichsdaten enthalten.

Revendications

1. Procédé pour sceller des conteneurs et assurer leur attribution correcte à un utilisateur-destinataire prédéterminé, comprenant les étapes consistant à :
 - attribuer un code d'identification ou de reconnaissance à un utilisateur-envoyeur ;
 - engendrer une clé électronique qui est unique pour un utilisateur-destinataire, la clé électronique comprenant des données personnelles de l'utilisateur-destinataire ;
 - remplir au moins un conteneur avec au moins un produit à transférer de l'utilisateur-envoyeur à l'utilisateur-destinataire ;
 - sceller ledit au moins un conteneur au moyen d'un sceau électronique (6) ;
 - transférer le conteneur à l'utilisateur-destinataire ;
 - accomplir une procédure d'identification ou de reconnaissance au moyen de la clé électronique de l'utilisateur-destinataire, et en cas de résultat positif de ladite procédure :
 - autoriser l'introduction du produit dans le conteneur ;
 - caractérisé en ce qu'il comprend aussi les étapes consistant à :
 - enregistrer des données d'information sur les procédures d'identification et d'introduction suivies, lesdites données d'information comprenant des données relatives à des tentatives d'introduction non autorisées et des tentatives d'introduction qui ont échoué et des données relatives aux divers passages d'un utilisateur à l'autre jusqu'à ce que l'utilisateur-destinataire soit atteint ; et
 - le sceau électronique (6) incluant un dispositif de verrouillage électronique (7), ledit dispositif de verrouillage stockant des données d'identification du produit contenu qui doit être transféré à l'utilisateur-destinataire, et des codes de commande, lesdits codes de commande constituant un code de déverrouillage pour le conteneur ;
 - ledit dispositif de verrouillage électronique (7) étant connectable audit conteneur et étant connectable à un dispositif de commande externe (1) au moyen de connecteurs (75, 76).

2. Procédé selon la revendication 1 caractérisé en ce que l'étape de remplissage comprend l'identification au moyen du dispositif de commande de la clé électronique et du conteneur, ces des derniers étant pré-codés ; 5
- la comparaison des données du conteneur avec celles de la clé électronique ;
 - l'impression des données concernant le résultat de la comparaison et la validation ou l'invalidation qui s'ensuit du conteneur ; 10
 - la fixation du conteneur de manière à l'attacher au dispositif de commande avant le remplissage ;
 - le remplissage du conteneur ; et 15
 - l'impression de données relatives au résultat de l'opération.
3. Procédé selon la revendication 2, caractérisé en ce que l'opération de remplissage comprend : 20
- la lecture du code de contenu du conteneur au moyen d'une unité de traitement extérieur ;
 - l'entrée du code de l'utilisateur-destinataire ;
 - l'activation de la procédure de scellage au moyen de moyens de verrouillage qui sont dotés d'une unité de mémoire permettant un transfert bidirectionnel de codes et la création de données de codes de commande, et 25
 - le scellage du conteneur au moyen des moyens de scellage électronique. 30
4. Procédé selon la revendication 1, caractérisé en ce que la procédure d'identification comprend : 35
- la lecture du code de déverrouillage du conteneur au moyen d'un dispositif de commande ;
 - la comparaison du code lu de déverrouillage du conteneur avec les données de la clé électronique de l'utilisateur-destinataire ; 40
 - l'impression des données obtenues à partir des résultats de comparaison et de l'autorisation ou de l'interdiction qui s'ensuit d'ouvrir le sceau électronique ; et
 - le stockage des données de résultat de l'opération. 45
5. Procédé selon la revendication 4, caractérisé en ce qu'il comprend en outre l'entrée d'un code opérateur dans le dispositif de commande. 50
6. Procédé selon la revendication 1, caractérisé en ce qu'en cas d'échec d'identification à la suite de la procédure d'identification, une procédure de déverrouillage de secours du sceau électronique est suivie. 55
7. Dispositif pour sceller des conteneurs et assurer leur attribution correcte à un utilisateur-destinataire prédéterminé comprenant :
- au moins un sceau électronique (6) en forme de boîte pour conteneur d'au moins un produit à attribuer à un utilisateur-destinataire, ledit sceau électronique comprenant des moyens de verrouillage électronique (7) ;
 - des moyens pour engendrer au moins une clé électronique programmable contenant un code de déverrouillage ;
 - des moyens de commande (1) agencés pour effectuer une comparaison entre un code de déverrouillage stocké dans lesdits moyens de verrouillage électronique et des données contenues dans la au moins une clé électronique ;
 - des moyens (30) d'entrée et d'introduction de code pour introduire et entrer des codes dans les moyens de commande ; caractérisé en ce que ladite au moins une clé électronique programmable est programmable avec des données d'information comprenant des données d'identification de l'utilisateur-destinataire ; Lesdits moyens de commande (1) sont munis de moyens de rapport (13) pour créer un rapport final de la comparaison effectuée ;
 - ledit sceau (6) comprend des moyens de couplage mécanique et des moyens de verrouillage électronique (7) ayant une unité de mémoire électronique (71) pour lesdits moyens mécaniques, ladite unité de mémoire étant adaptée pour stocker ledit code de déverrouillage pour l'ouverture dudit conteneur, ladite unité de mémoire stockant aussi des données relatives aux tentatives d'introduction non autorisées et aux tentatives d'introduction qui ont échoué au conteneur, afin de garder une trace de l'historique du conteneur ; les moyens de connecteur étant aussi prévus pour connecter ledit sceau électronique en forme de boîte à un conteneur à attribuer à un utilisateur-destinataire.
8. Dispositif selon la revendication 7, caractérisé en ce que lesdits moyens d'entrée et d'introduction de codes comprennent un clavier alphanumérique.
9. Dispositif selon la revendication 7, caractérisé en ce que lesdits moyens d'entrée et d'introduction de codes comprennent un lecteur de badge.
10. Dispositif selon la revendication 7 caractérisé en ce que ledit sceau électronique comprend un solénoïde d'actionnement.
11. Dispositif selon la revendication 10, caractérisé en ce que ledit sceau électronique comprend un corps en forme de boîte qui peut être ouvert ou fermé

pour recevoir lesdits moyens de couplage mécanique et les moyens de verrouillage électronique.

12. Dispositif selon la revendication 11, caractérisé en ce que ledit sceau électronique comprend en outre 5
une unité de traitement connectable auxdits
moyens de verrouillage électronique.
13. Dispositif selon la revendication 7, caractérisé en ce que lesdits moyens de commande comprennent 10
au moins une imprimante.
14. Dispositif selon la revendication 7, caractérisé en ce qu'il comprend des moyens pour l'identification d'un conteneur pour le produit à attribuer, lesdits 15
moyens comprenant au moins un lecteur pour lire des données sur le conteneur, des moyens pour comparer des données lues sur le conteneur et les données stockées dans une clé électronique, et 20
une imprimante pour imprimer les données de la comparaison.

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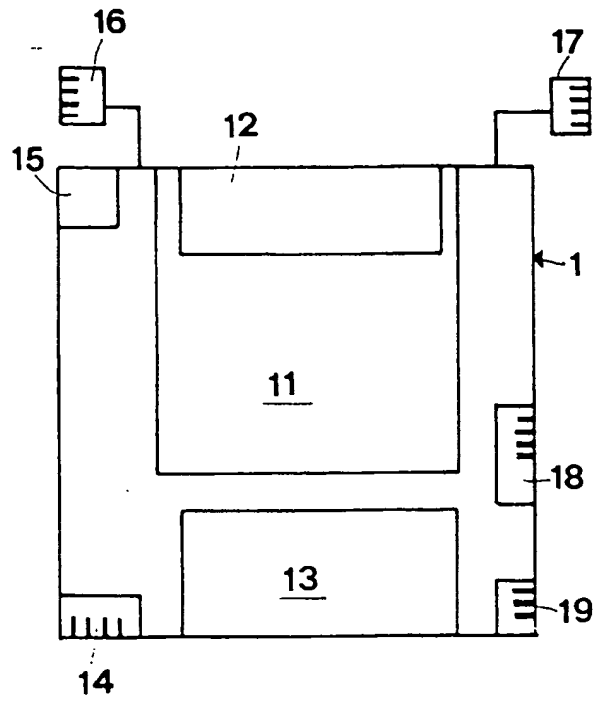
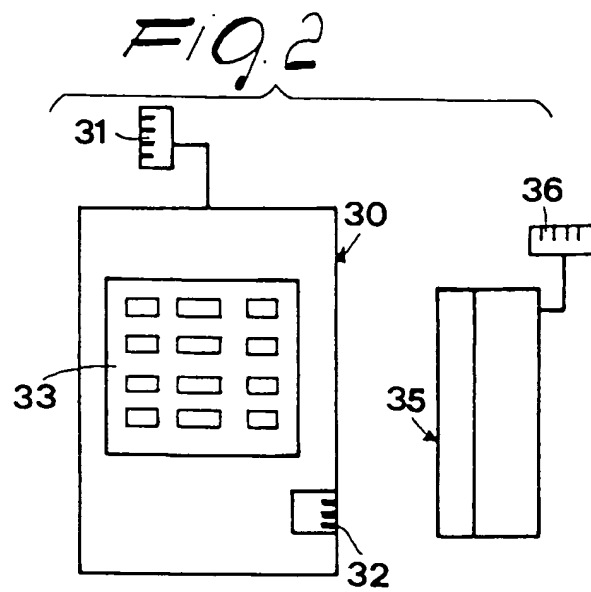


Fig. 1



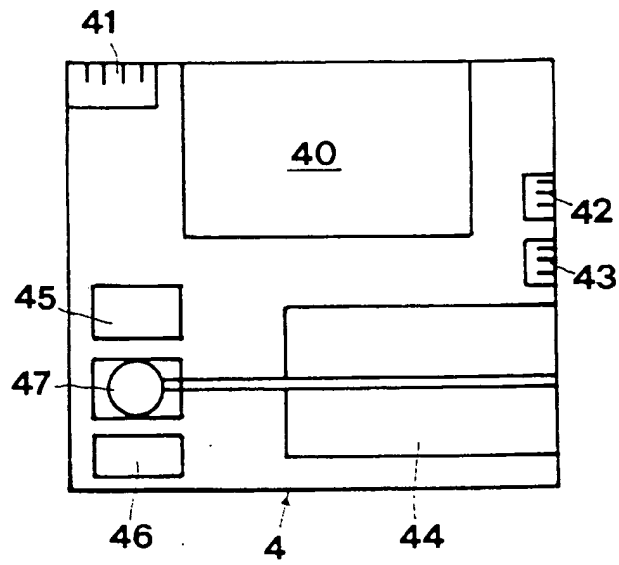
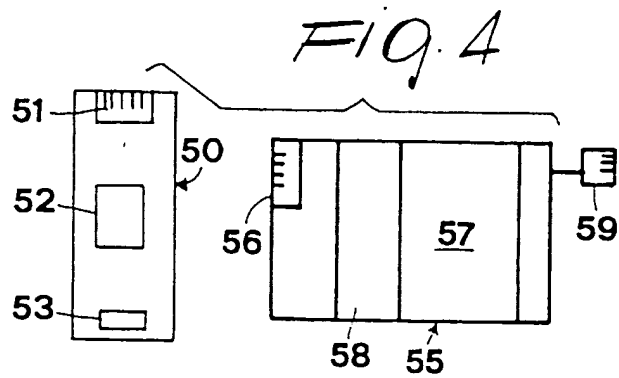


Fig. 3



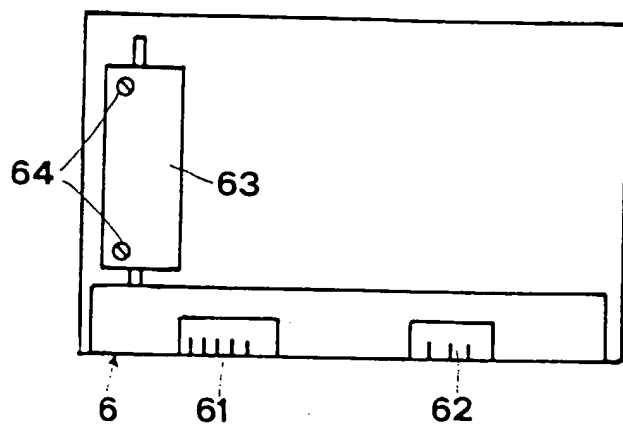


Fig. 5

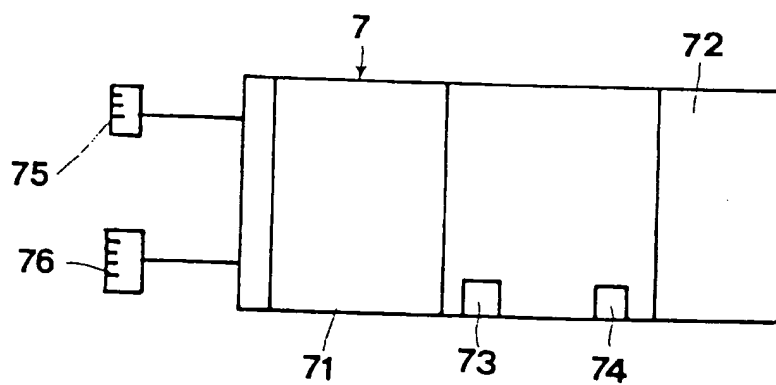


Fig. 6

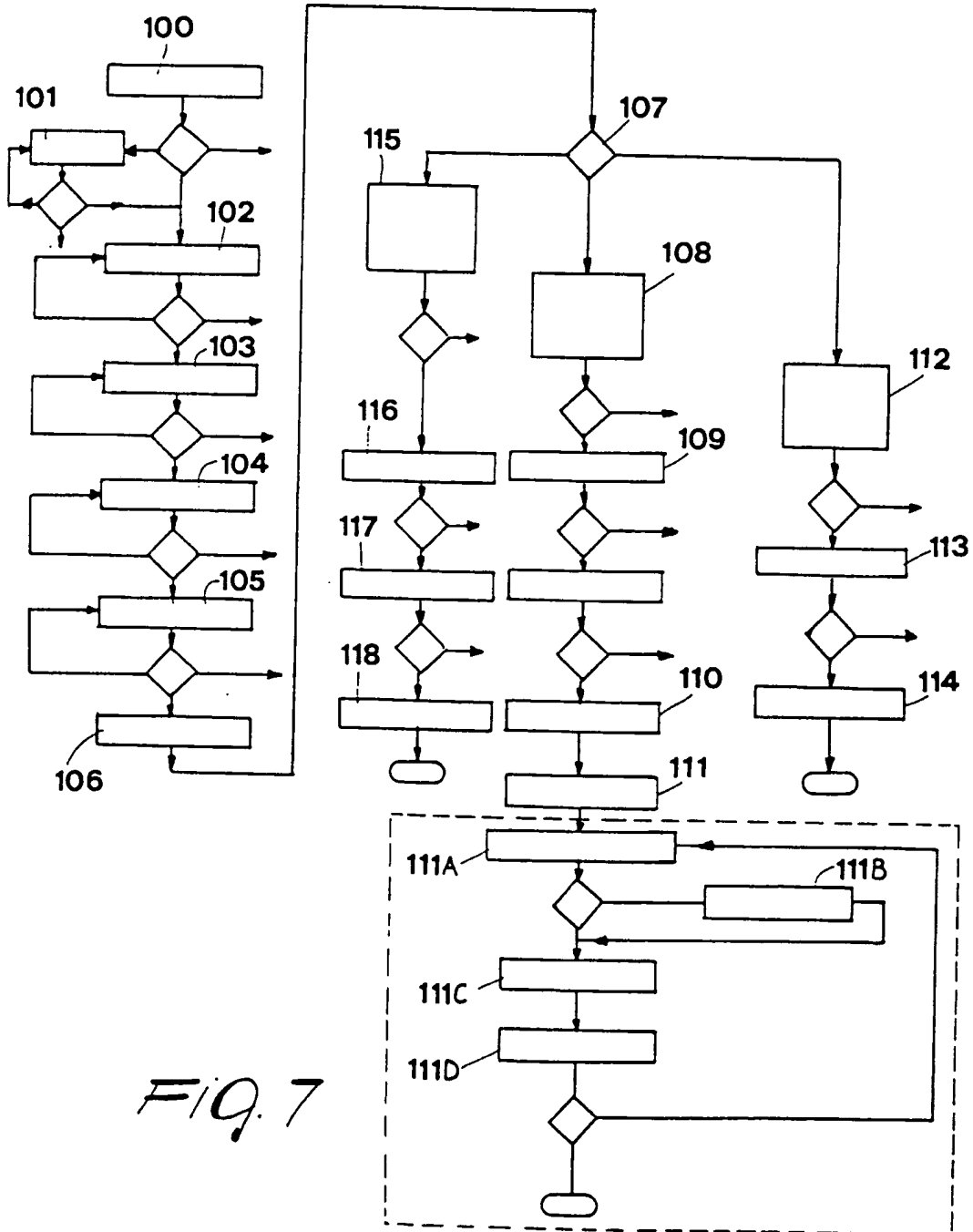
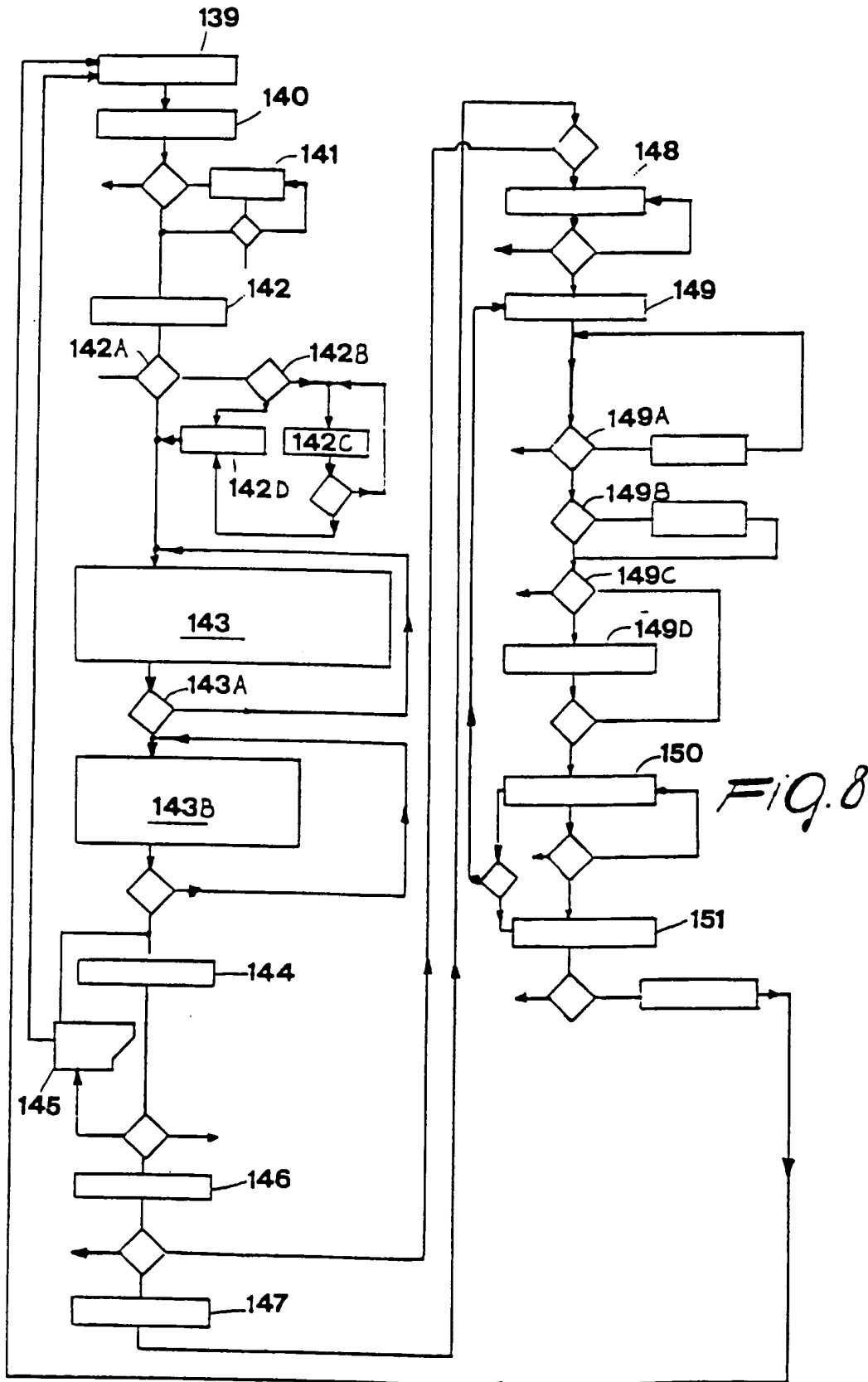


FIG. 7



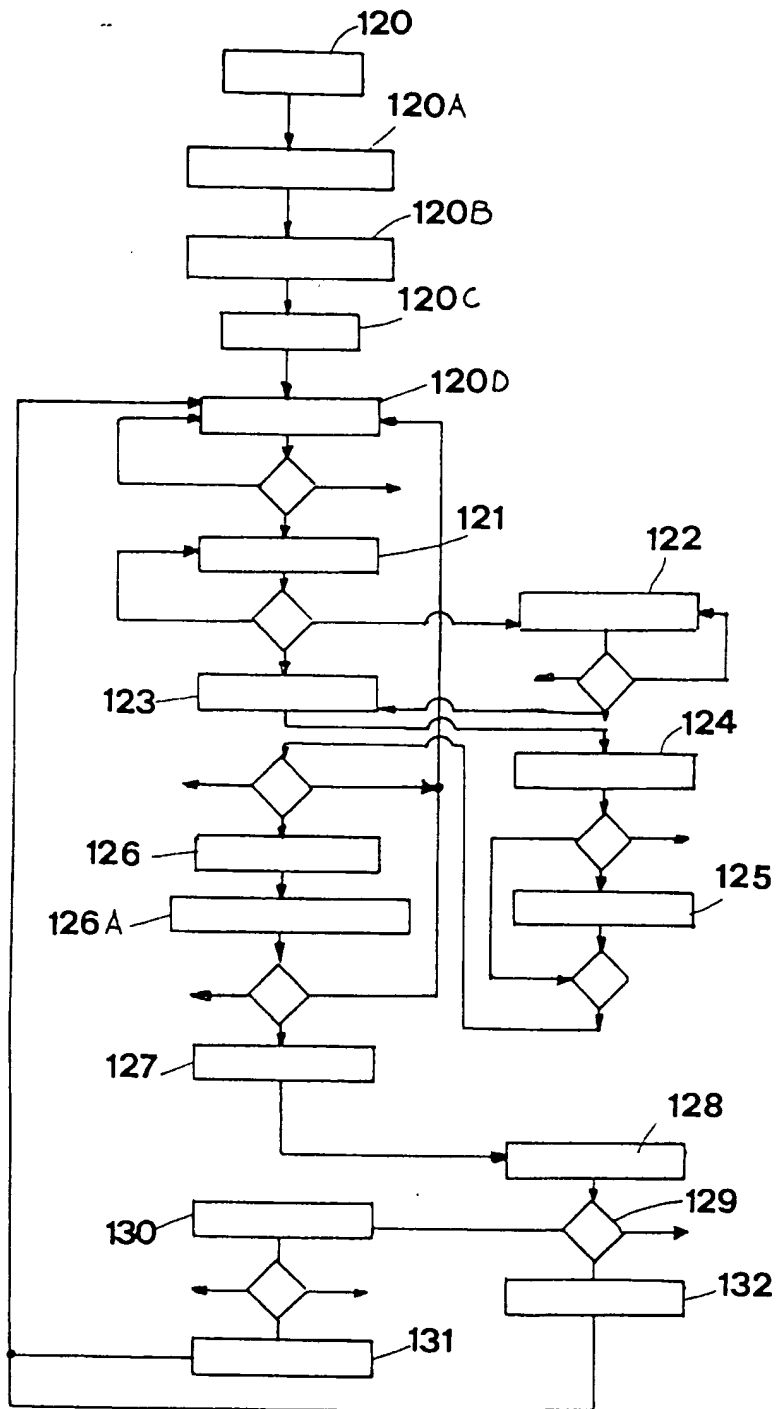


Fig. 9

Fig. 10

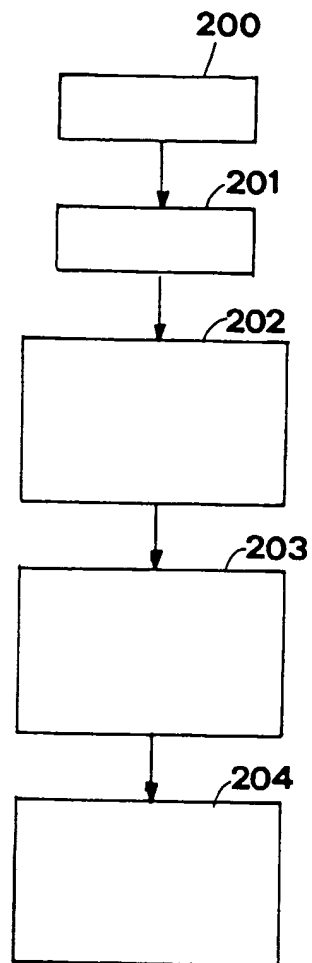


Fig. 11

